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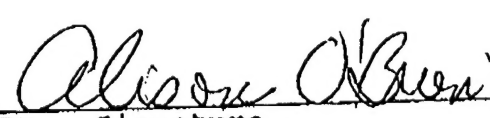
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1996 GORDON RESEARCH CONFERENCE  
on MICROBIAL TOXINS AND PATHOGENICITY

FINAL PROGRESS REPORT

AMRDC GRANT NO. DAMD17-96-1-6002

The Gordon Research Conference (GRC) on MICROBIAL TOXINS AND PATHOGENICITY was held in Andover, NH at Proctor Academy July 14 to July 19, 1996. The Conference was well-attended with 133 participants (attendance list attached). The attendees represented the spectrum of endeavor in this field coming from academia, industry, and government laboratories, both U.S. and foreign scientists, senior researchers, young investigators, and students.

In designing the formal speakers program, emphasis was placed on current unpublished research and discussion of the future target areas in this field. There was a conscious effort to stimulate lively discussion about the key issues in the field today. Time for formal presentations was limited in the interest of group discussions. In order that more scientists could communicate their most recent results, poster presentation time was scheduled. Attached is a copy of the formal schedule and speaker program and the poster program. In addition to these formal interactions, "free time" was scheduled to allow informal discussions. Such discussion are fostering new collaborations and joint efforts in the field.

I want to personally thank you for your support of this Conference. As you know, in the interest of promoting the presentation of unpublished and frontier-breaking research, Gordon Research Conferences does not permit publication of meeting proceedings. If you wish any further details, please feel free to contact me. Thank you.

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**SCHEDULE FOR 1996 GORDON CONFERENCE ON  
MICROBIAL TOXINS AND PATHOGENESIS  
JULY 14-19, 1996**

**SUNDAY PM**

**Pathogenicity Islands and Genetic Differences  
between Pathogens and Nonpathogens**

- |      |              |   |
|------|--------------|---|
| 7:30 | Welcome      |   |
| 7:45 | Fred Quinn   | Overview of session   |
| 7:50 | Jörg Hacker  | "Pathogenicity islands in uropathogenic <i>E. coli</i> "  |
| 8:20 | Discussion   |   |
| 8:30 | James Kaper  | "The locus of enterocyte effacement (LEE) locus in enteropathogenic <i>E. coli</i> "                  |
| 9:00 | Discussion   |   |
| 9:10 | Robert Perry | "An island of pathogenicity in <i>Yersinia pestis</i> affecting transmission and virulence of plague" |
| 9:40 | Discussion   |   |

**MONDAY AM**

**Antigenic Variation**

- |       |               |  |
|-------|---------------|--|
| 9:00  | June Scott    | Overview of session  |
| 9:05  | Janne Cannon  | "Importance of the variation of gonococcal opacity proteins (opas) in a human model of <i>Neisseria gonorrhoeae</i> infection" |
| 9:35  | Discussion    |  |
| 9:45  | Alan Barbour  | "Genetic basis for antigenic variation of outer surface proteins (osps) in <i>Borrelia burgdorferi</i> "                       |
| 10:15 | Discussion    |  |
| 10:25 | Coffee        |  |
| 10:45 | Mumtaz Virji  | "Interactions of variable <i>Neisseria meningitidis</i> surface components with the host cell"                                 |
| 11:15 | Discussion    |  |
| 11:25 | Martin Blaser | "Variability of the S layer of <i>Campylobacter</i> "  |
| 11:55 | Discussion    |  |
| 12:05 | Photo session |  |
| 12:15 | Lunch         |  |

**Monday PM**

**Chaperones and Escorts**

- |      |                |  |
|------|----------------|--|
| 7:30 | Sue Straley    | Overview of session  |
| 7:35 | Guy Cornelis   | "Secretion of <i>Yersinia</i> outer proteins (YOPs)"                         |
| 8:05 | Discussion     |  |
| 8:15 | Claude Parsot  | "Molecular basis for export of <i>Shigella</i> invasion protein antigens"    |
| 8:45 | Discussion     |  |
| 8:55 | Scott Hultgren | "Synthesis and assembly of uropathogenic <i>Escherichia coli</i> P fimbriae" |
| 9:25 | Discussion     |  |

**TUESDAY AM****Activation, Modification, and Trafficking of Toxins and Toxin Receptors**

- 9:00 Drusilla Burns Overview of session  
9:05 Angela Melton-Celsa "Activation of Shiga-like toxins of *E. coli* by intestinal mucus"  
9:35 Discussion  
9:45 Erik Hewlett "Biochemical modification of adenylate cyclase of *Bordetella pertussis* and  $\alpha$ -hemolysin of *E. coli*"  
  
10:15 Discussion  
10:25 Coffee  
10:45 Xiaowen Rudner "Mechanism of activation of *E. coli* heat stable toxin (STa) intestinal receptor guanylyl cyclase C"  
  
11:15 Discussion  
  
11:25 Wayne Lencer "Targeting of cholera toxin and *E. coli* heat-labile toxin in polarized epithelia"  
  
11:55 Discussion  
12:05 Lunch

**TUESDAY PM*****Salmonella*-A Tool and What's New**

- 7:30 Eduardo Groisman Overview of session  
7:35 David Holden "Signature-tagged mutagenesis of *Salmonella*"  
8:05 Discussion  
8:15 Sam Miller "Secreted proteins from *Salmonella*"  
8:45 Discussion  
8:55 Cathy Lee "A new regulator of *Salmonella* virulence"  
9:25 Discussion

**WEDNESDAY AM****Cytoskeletal Rearrangements and Cell Signalling Mediated by Toxins**

- 9:00 Bruce McClane Overview of session  
9:05 Pasale Cossart "How *Listeria monocytogenes* triggers the actin cytoskeleton during entry and intracellular movements"  
  
9:35 Discussion  
9:45 Cindy Sears "Effects of *Bacteroides fragilis* toxin on the actin skeleton of the target host cell"  
  
10:15 Discussion  
10:25 Coffee  
10:45 Klaus Aktories "Modification of Rho by *Clostridium difficile* cytotoxin"  
11:15 Discussion  
11:25 Motoyuki Sugai "Mechanisms of Rho modification by *Staphylococcal aureus* epidermal cell differentiation inhibitor EDIN and *Escherichia coli* Cytotoxic Necrotizing Factor (CNF)"  
  
11:55 Discussion  
12:05 Lunch

**WEDNESDAY PM****Structure/function Analyses of Virulence Determinants and Regulators**

7:30	Randy Holmes	Overview of session
7:35	Carlos Petosa	"Crystal structure of the anthrax protective antigen"
8:05	Discussion	
8:15	Wim Hol	"Structure of the diphtheria toxin repressor"
8:45	Discussion	
8:55	Ralph Isberg	" <i>Yersinia</i> invasion-receptor interaction"
9:25	Discussion	

**THURSDAY AM****Immunization: Immune Modulation, Vectors, and New Approaches**

9:00	Lee Metcalf	Overview of session
9:05	Chuck Elson	" <i>E. coli</i> heat labile toxin and cholera toxin as adjuvants"
9:35	Discussion	
9:45	Mary Jo Wick	"Factors influencing the efficiency of antigen processing and presentation"
10:15	Discussion	
10:25	Coffee	
10:45	Bob Munford	"Viral vectors with inducible acute-phase protein promoters"
11:15	Discussion	
11:25	Stephen Johnston	"Expression library immunization"
11:55	Discussion	
12:05	Business Meeting	
12:15	Lunch	

**THURSDAY PM****Plants, Antibodies, and Vaccines**

7:30	Mike Levine	Overview of session
7:35	Charles Arntzen	"Transgenic plants as vaccine vectors-the technology"
8:20	Discussion	
8:35	John Clements	"Transgenic plants as vaccine vectors-the biology"
9:05	Discussion	

This conference has been supported by grants from the Food and Drug Administration (FD-R-001221-01), the NIH (1R13AI40020-01, and the Department of the Army (DAMD 17-96-1-6002). [The content of this information does not necessarily reflect the position or the policy of the government and no official endorsement should be inferred.]

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## POSTER SESSIONS

Number poster boards are located in the Chapel.  
You are expected to be present between the hours of  
4:00 - 6:00 p.m. on the day your poster is displayed.

1. The number by your name represents the number on the poster board that your poster should be displayed on.
2. Posters should be on display by 2:00 p.m. each day and left up until 12:00 noon the following day.
3. Additional posters may be displayed where there is an open number on the list (23 posters per day is the limit).

## Monday's Posters -- 4:00-6:00 PM

1. D. W. K. Acheson, R. Moore, L. L. Lincicome, S. Nakagawa, and G.T. Keusch (New England Medical Center and Tufts University, Boston, MA)  
Interactions of Shiga toxins with intestinal epithelial cells - potential role in the pathogenesis of thrombotic microangiopathy.
2. Liz Richter, Hugh S. Mason, Tariq A. Haq, and Charles J. Arntzen (Boyce Thompson Institute for Plant Research, Ithaca, NY)  
Vaccine production in transgenic plants.
3. Vivek Bajaj, Robin Lucas, Clara Hwang, and Catherine A. Lee (Harvard Medical School, Cambridge, MA)  
Coordinate regulation of *S. typhimurium* invasion genes by environmental and regulatory factors is mediated by control of *hlyA* expression.
4. Viviane Finck-Barbagon, and Joseph T. Barbieri (Medical College of Wisconsin, Milwaukee, WI)  
Preferential processing of the S1 subunit of pertussis toxin that is bound to eukaryotic cells.
5. Andreas J. Bäuml, Renée M. Tsois, and Fred Heffron (Oregon Health Sciences University, Portland, OR)  
Evolution of *Salmonella* virulence: acquisition of fimbrial operons.
6. D. Bieber, S. W. Ramer, Y.-C. Wu, and G. K. Schoolnik (Stanford University, Stanford, CA)  
Growth-phase-dependent expression of the *bfp* operon in EPEC (Enteropathogenic *E. coli*) directs the formation of the AA (autoaggregation) phenotype.
7. Chris Rode, and Craig Bloch (University of Michigan, Ann Arbor, MI)  
Sequencing the differences: new tools for purification of enterobacterial pathogenicity islands.
8. Karen T. Tashima, Patricia A. Carroll, Darren E. Higgins, Victor J. DiRita, Stephen B. Calderwood (Massachusetts General Hospital, Harvard Medical School, Boston, MA)  
A novel mutation in *Vibrio cholerae* affecting expression of the ToxR regulon.
9. Andrew Camilli (Tufts University School of Medicine, Boston, MA)  
Analysis of a *Vibrio cholerae* two-component signal transduction system operative during infection.
10. N. Carbonetti, C. Chen, T. Irish, C. O'Connell, E. Rostapshova, and G. Hadley (University of Maryland Medical School, Baltimore, MD)  
Development of pertussis and cholera toxins as cytotoxic T lymphocyte vaccine vector molecules.

11. Erin K. Hickey, and Nicholas P. Cianciotto (Northwestern University, Chicago, IL)  
A Fur-repressed gene from *Legionella pneumophila* that promotes intracellular infection and encodes a protein homologous to LucA/C.
12. J. D. Clements, C. Chong, M. Friberg, and B. L. Dickinson (Tulane University School of Medicine)  
Use of *Escherichia coli* heat-labile enterotoxin as a mucosal adjuvant.
13. Jenifer Coburn, Loranne Wierbinski, Wambui Chege, and John M. Leong (Tufts-New England Medical Center, Boston, MA; University of Massachusetts Medical School, Worcester, MA)  
Integrin binding by Lyme disease spirochetes.
14. Jimmy D. Ballard, R. John Collier, and Michael N. Starnbach (Harvard Medical School, Boston, MA)  
Anthrax toxin-mediated delivery of a cytotoxic T-cell reactive peptide in vivo.
15. J. Bradford Kline, and Carleen M. Collins (University of Miami School of Medicine, Miami, FL)  
Mutational analysis of streptococcal pyrogenic exotoxin A (SpeA) amino acid residues required for Class II MHC molecule binding and T cell activation.
16. Andrew Martone, Joseph Pitula, and Terry C. Connell (The State University of New York at Buffalo, Buffalo, NY)  
Iron acquisition by *Bordetella avium*, a respiratory pathogen of birds.
17. Y. Zhang, S. Dhandayuthapani, and V. Deretic (University of Texas HSCSA, San Antonio, TX)  
Molecular basis for the exquisite sensitivity of *Mycobacterium tuberculosis* to isoniazid.
18. Zehava Eichenbaum, Brian D. Green, and June R. Scott (Emory University, Atlanta, GA)  
Iron starvation causes release from the group A streptococcus of the ADP ribosylating protein called Plr or SDH.
19. J. D. Fetherston, S. W. Bearden, and R. D. Perry (University of Kentucky Medical Center, Lexington, KY)  
YbtA, an *araC*-type regulator of the *Yersinia pestis* pesticin/yersinia bactin receptor.

## Tuesday's Posters -- 2:00-4:00 PM

1. Theresa M. Finn (CBER, Food and Drug Administration, Rockville, MD)  
The *Bordetella* family of "tailed secreted proteins".
2. T.L. Yahr, J. Goranson, and D.W. Frank (Medical College of Wisconsin, Milwaukee, WI)  
Exoenzyme S of *Pseudomonas aeruginosa* is secreted by a type III secretion pathway.
3. Nancy Freitag, and Chetna Thayyullathil (Public Health Research Institute, New York, NY)  
Characterization of *Listeria monocytogenes* intracellular gene expression using the fluorescent green protein of *Aequorea victoria*.
4. A. Hauser, P. J. Kang, S. Fleiszig, K. Mostov, G. Apodaca, J. Wiener-Kronish, and J. Engel (University of California, San Francisco, CA)  
An *in vitro* genetic screen to detect *Pseudomonas aeruginosa* genes involved in cytotoxicity.
5. Scotty L. Walker, Leena S. Hiremath, and Darrell R. Galloway (The Ohio State University, Columbus, OH)  
Analysis of ToxR (RegA) -mediated open complex formation at the *Pseudomonas aeruginosa* *toxA* promoter.
6. Eric C. LaCasse, Mazen T. Saleh, Bruce Patterson, Mark D. Minden, and Jean Gariépy (University of Toronto, Toronto, Ontario, Canada; Ontario Cancer Institute, Princess Margaret Hospital, Toronto, Canada)  
Toxin purging of bone marrow prior to transplant eliminates human lymphoma.
7. Mazen T. Saleh, Jim Ferguson, Joan M. Boggs, and Jean Gariépy (University of Toronto and the Ontario Cancer Institute, Toronto, Canada)  
The role of the hydrophobic domain of the A<sub>1</sub> fragment of SLT-1 in cell toxicity.
8. Terry Njoroge, Robert Genco, and Caroline Attardo Genco (Morehouse School of Medicine, Atlanta, GA)  
A role for fimbriae in the adherence of *Porphyromonas gingivialis* to oral epithelial cells.
9. T. Grant, V. Bennett-Wood, R. Robins-Browne (Royal Children's Hospital; University of Melbourne, Melbourne, Australia)  
Identification of novel virulence attributes in clinical isolates of *Yersinia enterocolitica* lacking classical virulence markers.
10. Donald G. Guiney, Chin-Yi Chen, Lars Eckmann, Stephen Libby, and Joshua Fierer (University of California-San Diego School of Medicine, San Diego, CA)  
Regulation of the *rpoS* gene of *Salmonella typhimurium* *in vitro* and in macrophages.

11. Marci A. Scidmore, Daniel D. Rockey, Elizabeth R. Fischer, Robert A. Heinzen, and Ted Hackstadt (National Institute of Allergy and Infectious Diseases, Rocky Mountain Laboratories, Hamilton, MT)  
Vesicular interactions of the *Chlamydia trachomatis* inclusion are determined by chlamydial early protein synthesis rather than route of entry.
12. David M. Johnston, and Janne G. Cannon (The University of North Carolina at Chapel Hill, Chapel Hill, N.C.)  
A strategy for constructing mutant strains of *Neisseria gonorrhoeae* containing no new antibiotic resistance markers using a two gene cassette with selectable and counterselectable markers.
13. J.P. Long, and E.A. Kapral (The Ohio State University, Columbus, OH)  
The staphylococcus-epidermidis leukocidin.
14. Marcia M. Hobbs, and Tom H. Kawula (University of North Carolina at Chapel Hill, Chapel Hill, NC)  
*Haemophilus ducreyi* disrupts basal keratinocyte tight junctions and elicits a unique cytokine induction pattern in an *in vitro* human skin model.
15. Efrain M. Ribot, and C. Harold King (Centers for Disease Control and Prevention, Atlanta, GA)  
Identification of differentially expressed genes by *Mycobacterium haemophilum* in association with human epithelial cells.
16. Kurt R. Klimpel, Terry Goletz, Naveen Arora, Stephen H. Leppla, Jerry M. Keith, and Jay Berzofsky (National Institute of Dental Research, Bethesda, MD; National Cancer Institute, Bethesda, MD)  
Delivery of proteins to the cytosol of cells for processing and presentation with class I major histocompatibility molecules by anthrax toxin lethal factor-antigen fusions.
17. Camille Locht, Geneviève Renauld, Nathalie Mielcarek, Gilles Riveau, and Isabelle Coppens (Institut Pasteur, Lille, France)  
Antigen presentation by the *Bordetella pertussis* filamentous hemagglutinin.
18. Dominique Raze, Hiroko Sato, and Camille Locht (Institut Pasteur, Lille, France)  
Genetic exchange of the S2 and S3 subunits in pertussis toxin.
19. Douglas M. Heithoff, Christopher P. Conner, Philip C. Hanna, Steven Julio, Ute Hentschel, and Michael J. Mahan (University of California, Santa Barbara, CA)  
Host-specific induction of *Salmonella* virulence genes.

## Wednesday's Posters -- 2:00-4:00 PM

1. Iñigo Lasa, Violaine David, Edith Gouin, Jean-Baptiste Marchand, and Pascale Cossart (Institut Pasteur, Paris, France; CNRS, Gif-sur-Yvette, France)  
The amino-terminal part of ActA is critical for the actin-based motility of *Listeria monocytogenes*; the central proline rich region acts as a stimulator.
2. J. Mengaud, M. Lebrun, M. Lecuit, H. Ohayon, P. Gounon, R.-M. Mège, and P. Cossart (Institut Pasteur, Paris, France; Institut National de la Santé et de la Recherche Médicale Unité, Paris, France)  
Internalin-mediated entry of *Listeria monocytogenes* into epithelial cells requires interaction between surface exposed internalin and E-cadherin.
3. Hélène Marquis, Howard Goldfine, and Daniel A. Portnoy (University of Pennsylvania, Philadelphia, PA)  
Intracellular activation of *Listeria monocytogenes* phospholipase C.
4. R. E. Collie, and B. A. McClane (University of Pittsburgh School of Medicine, Pittsburgh, PA)  
Comparison of isolates from different *Clostridium perfringens* enterotoxin-associated gastrointestinal diseases.
5. Beth A. McCormick, Charles A. Parkos, Sean P. Colgan, Denice Carnes, Samuel Miller, and James L. Madara (Brigham and Women's Hospital, Boston, MA)  
Surface attachment of *Salmonella typhimurium* to intestinal epithelia elicits the secretion of a novel neutrophil chemoattractant.
6. Timothy K. McDaniel, and James B. Kaper (University of Maryland School of Medicine, Baltimore, MD)  
A cloned pathogenicity island of enteropathogenic *E. coli* confers the attaching and effacing phenotype on *E. coli* K-12.
7. Kevin S. McIver, Shambhavi Subbarao, Ellen M. Kellner, Andrew S. Heath, and June R. Scott (Emory University, Atlanta, GA)  
Identification of *isp*: a locus encoding an immunogenic secreted protein conserved among the group A streptococci.
8. Julie L. Badger, and Virginia L. Miller (University of California, Los Angeles, CA)  
Identification of a locus responsible for proper *inv* expression in *Yersinia enterocolitica*.
9. R.S. Munson, Jr., J. Wang, W. Melaugh, A. Campagnari, S. Grass, and B. Gibson. (Children's Hospital Research Foundation and The Ohio State University, Columbus, OH; University of California at San Francisco, San Francisco, CA; State University of New York at Buffalo, Buffalo, NY; Washington University, St. Louis, MO)  
Identification and characterization of a *Haemophilus ducreyi* mutant deficient in D-glycero-D-manno-heptosyltransferase.

10. Katherine L. Palmer, William E. Goldman, and Robert Munson, Jr. (Washington University, St. Louis, MO; Children's Hospital Research Foundation, Columbus, OH; Ohio State University, Columbus, OH)  
An isogenic hemolysin-deficient mutant of *Haemophilus ducreyi* lacks the ability to produce cytopathic effect on human foreskin fibroblasts.
11. C.R. Tinsley, and X. Nassif (INSERM, Paris Cedex, France)  
Analysis of the genetic differences between *Neisseria meningitidis* and *Neisseria gonorrhoeae*: two closely related bacteria expressing two different pathogenicities.
12. L.P. Nataro, S. Hicks, A. D. Phillips, and C. L. Sears (University of Maryland School of Medicine, Baltimore, MD; Royal Free Hospital, London, England; Johns Hopkins School of Medicine, Baltimore, MD)  
A paradigm for the pathogenesis of enteroaggregative *Escherichia coli*.
13. T. G. Obrig, C. B. Louise, and M. Tran (University of Rochester School of Medicine and Dentistry, Rochester, NY)  
Induction of Shiga-like toxin sensitivity in endothelial cells involves protein kinase C, but not NF- $\kappa$ B.
14. E. Oswald, S. Pérès, O. Marchès, J.P. Nougayrède, F. Hérault, C. Tasca, and J. De Rycke (Ecole Nationale Vétérinaire, Toulouse-Cedex, France)  
The death kiss of pathogenic *Escherichia coli* strains producing CNF.
15. Emanuele Papini, Barbara Satin, Cecilia Bucci, Marina de Bernard, John L. Telford, Roberto Maenad, Reno Reappeal, Marino Zerial, and Cesare Montecucco (University of Padova, Padova, Italy; University of Naples, Napoli, Italy; I.R.I.S., Siena, Italy; European Molecular Biology Laboratory, Heidelberg, Germany)  
The small GTP-binding protein rab7 is essential for cellular vacuolation induced by *Helicobacter pylori* cytotoxin.
16. Marina de Bernard, Emanuele Papini, Vincenzo de Filippis, Elena Gottardi, John L. Telford, Roberto Manetti, Angelo Fontana, Rino Rappouli, and Cesare Montecucco (University of Padova, Padova, Italy; I.R.I.S., Siena, Italy)  
Low pH activates the vacuolating toxin of *Helicobacter pylori*, which becomes acid and pepsin resistant.
17. Jeffrey C. Pepe, and Stephen Lory (University of Washington, Seattle, WA)  
Structure/function analysis of *P. aeruginosa* PilD, a bifunctional enzyme required for type IV pilus biogenesis and extracellular protein secretion.
18. Mariagrazia Pizza (The Chiron-Biocrine Immunobiological Research Institute, Siena, Italy)  
Comparison of properties induced by mutations in the active site or in the proteolytic loop of LT.



## Thursday -- 2:00-4:00 PM

1. K.A. Birkness, J.H. Bartlett, E.H. White, G.W. Newman, B.D. Gold, and F.D. Quinn (Centers for Disease Control and Prevention, Atlanta, GA; Emory University School of Medicine, Atlanta, GA)  
A tissue culture bilayer model for the study of bacterial pathogenesis.
2. Sandra W. Ramer, David Bieber, C-Y. Wu, and Gary K. Schoolnik (Stanford University, Stanford, CA)  
Bundle-forming pilus production in enteropathogenic *E. coli*: physiologically-regulated biogenesis requires the *bfp* operon.
3. Bärbel Raupach, and Stanley Falkow (Stanford School of Medicine, Stanford, CA)  
Signature-tagged mutants: A tool to detect virulence genes in *Salmonella typhimurium*.
4. Dominique Raze, and Camille Loch (Institut Pasteur de Lille, Lille Cedex, France)  
Genetic exchange of the S2 and S3 subunits in pertussis toxin.
5. Reini Hurme, Kurt D. Berndt, Ellen Namork, and Mikael Rhen (Karolinska Institute, Stockholm, Sweden; National Institute of Public Health, Oslo, Norway)  
A new type of sensor-regulator in *Salmonella*.
6. Mazen T. Saleh, and Jean Gariépy (University of Toronto; Ontario Cancer Institute, Toronto, Ontario, Canada)  
The role of the hydrophobic domain of A<sub>1</sub> fragment of SLT-1 in cell toxicity.
7. Maria Sandkvist (National Institute of Dental Research, NIH, Bethesda, MD)  
Extracellular secretion of cholera toxin.
8. Clare K. Schmitt, Stephen C. Darnell, and Alison D. O'Brien (Uniformed Services University of the Health Sciences, Bethesda, MD)  
Flagellar secretory machinery not required for virulence of *Salmonella typhimurium*.
9. P. Sebo, C. Fayolle, T. Basar, A. Pankova, R. Osicka, D. Ladant, A. Ullmann, and C. Leclerc (Czech Academy of Sciences, Prague, Czech Republic; Institut Pasteur, Paris, France)  
Structural flexibility probing of *Bordetella pertussis* adenylate cyclase toxin by insertion of heterologous peptides and its application to *in vivo* induction of specific cellular immune responses against viral CD8+ epitopes.
10. R. D. Shahin, M. F. Leef, and J. Barbic' (CBER, Food and Drug Administration, Bethesda, MD)  
Evidence for more than one mechanism of protection to respiratory *Bordetella pertussis* infection.
11. J-C. Sirard, C. Fayolle, C. de Chastellier, M-R. Popoff, C. Leclerc, P. Berche, and M. Mock (Institut Pasteur, Paris, France; Faculté de Médecine Necker, Paris, France)  
*Bacillus anthracis*: towards new veterinary vaccines.



12. James M. Slauch, and Theresa L. Rebello (University of Illinois, Urbana, IL)  
Identification and characterization of *in vivo* induced *Salmonella typhimurium* genes that are specifically required for colonization of the mouse intestine.
13. P.L.C. Small, Diane Welty, and Lu Barker (Rocky Mountain Laboratory, Hamilton, MT)  
Isolation and characterization of a *Mycobacterium marinum* mutant which is attenuated for virulence *in vivo* and which fails to survive within macrophage cell lines.
14. Michael N. Starnbach (Harvard Medical School, Boston, MA)  
Cytotoxic T-cell responses to bacterial pathogens.
15. Scott Stibitz (Food and Drug Administration, Bethesda, MD)  
Mutations in the *bvgA* gene of *Bordetella pertussis* having a "reverse differential" effect on the expression of *ptx* and *pha*.
16. Matthew L. Nilles, Andrew W. Williams, Elzbieta Skrzypek, and Susan C. Straley (University of Kentucky, Lexington, KY)  
LcrG and LcrV of *Yersinia pestis* interact to form a stable complex.
17. Toru Tobe, Indira Sohel, and Gary K. Schoolnik (Howard Hughes Medical Institute, Stanford University School of Medicine, Stanford, CA)  
Regulation of bundle-forming pili (BFP) expression through *bfpTVW* genes in enteropathogenic *Escherichia coli*.
18. Leah R. Turner, and Stephen Lory (University of Washington, Seattle, WA)  
Mapping of the domains that confer functional specificity to the related proteins XcpR and PilB of *Pseudomonas aeruginosa*.
19. Matthew Waldor, and John J. Mekalanos (New England Medical Center, Boston, MA; Harvard Medical School, Boston, MA)  
Lysogenic conversion by a filamentous phage encoding cholera toxin.
20. D.L. Weinstein, B. L. O'Neill, and E.S. Metcalf (Uniformed Services University of the Health Sciences, Bethesda, MD)  
The initial association of *S. typhi* with small intestinal epithelial cell lines differs from the early interactions of other *Salmonella* spp.
21. Dana L. Swenson, Nick O. Bukanov, Douglas E. Berg, and Rodney A. Welch (University of Wisconsin-Madison, Madison, WI; Washington University School of Medicine, St. Louis, MO)  
Two pathogenicity islands in uropathogenic *Escherichia coli* strain J96: cosmid cloning and sample sequencing.
22. Shahaireen Pellett, and Rodney A. Welch (University of Wisconsin, Madison, WI)  
*Escherichia coli* hemolysin mutants with altered target cell specificity.

23. Brenda A. Wilson, Xinjun Zhu, Virgilio Ponferrada, John Peterson, Jefferson Vallance, and Luo Lu (Wright State University School of Medicine, Dayton, OH)  
*Pasteurella multocida* toxin activates the  $IP_3$  pathway in *xenopus* oocytes via  $G_q$ -protein-coupled phospholipase  $C\beta 1$ .